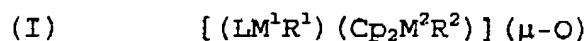


Claims:

1. A binuclear, oxygen-bridged, bimetallic complex of the general formula I:



where:

$M^1 = Al, Ge, Zr$ or Ti ;

$M^2 = Zr, Ti$ or Hf ;

Cp = cyclopentadienyl;

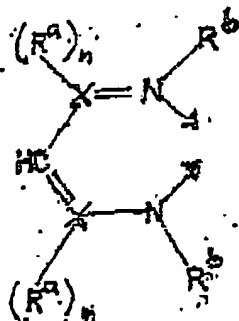
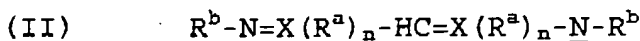
$R^1, R^2 = H$; $C(1-6)alkyl$; halogen; aryl; $SiMe_3$ and alkylaryl where aryl = $C_6H_5-nX_n$ and X = halogen, $C(1-6)alkyl$, aryl, NO_2 , SO_3H , NR^3_2 , where $R^3 = C(1-6)alkyl$ or H and $n = 0$ to 5 ; and

L = a bidentate, doubly heteroatom-coordinated organochemical ligand which together with the metal M^1 forms a 5- or 6-membered ring.

2. The binuclear, oxygen-bridged, bimetallic complex as claimed in claim 1, in which $R^1, R^2 = methyl, ethyl, i-propyl, t-butyl, halogen, phenyl, alkylphenyl, SiMe_3$, and L is a bidentate, doubly nitrogen-coordinated organochemical ligand which together with the metal M^1 forms a 5- or 6-membered ring.

3. The bimetallic complex as claimed in claim 1 or 2, characterized in that it is a heterobimetallic complex, preferably one in which $M^1 = aluminum$ and $M^2 = zirconium$, more preferably a complex of the formula $[(LAlMe)(Cp_2ZrR^2)](-O)$, where R^2 is Me or Cl .

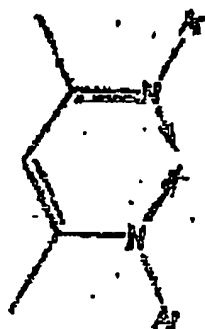
4. The bimetallic complex as claimed in any of claims 1 to 3, characterized in that the ligand L has the following composition (formula II):



5 where: $X = C$ or P ;

$$R^a, R^b = R^1, R^2; n = 1 \text{ when } X = C; n = 2 \text{ when } X = P.$$

5. The bimetallic complex as claimed in claim 4,
10 characterized in that the ligand L has the
following composition:



15

in particular with Ar = 2,6-iPr₂C₆H₃.

20 6. A process for preparing a binuclear, oxygen-bridged, bimetallic complex as claimed in any of claims 1 to 5, characterized in that a precursor complex of the formula $LM^1R^1(OH)$ is reacted with a

metallocene precursor complex $\text{Cp}_2\text{M}^2(\text{R}^2)_2$ or $\text{Cp}_2\text{M}^2\text{MeR}^2$ or $\text{Cp}_2\text{M}^2\text{HX}$, where X = halogen, preferably in an inert solvent.

- 5 7. A catalyst preparation for the polymerization of olefins which comprises at least one complex as claimed in any of claims 1 to 5 and at least one cocatalyst.
- 10 8. The catalyst preparation as claimed in claim 7, characterized in that the cocatalyst is an alkylaluminoxane, preferably methylaluminoxane (MAO).
- 15 9. The use of binuclear, oxygen-bridged, bimetallic complexes comprising a transition metallocene and an organic Al, Ge, Zr or Ti compound which does not contain a cyclopentadienyl group, in particular complexes as claimed in any of claims 1 to 5, as polymerization catalysts.
- 20 10. The use as claimed in claim 9, characterized in that at least one heterobimetallic complex is used.
- 25 11. The use as claimed in claim 9 or 10, characterized in that the catalyst is used in combination with a cocatalyst of the $[\text{MeAlO}]_x$ type, trialkylaluminum or alkylhaloaluminum, in particular in combination with methylaluminoxane (MAO).